

## **CLAIMS**

What is claimed is:

1. An electronic ballast comprising:  
2 an input rectifier circuit for rectifying an input voltage;  
3 a voltage inverter circuit for receiving a rectified input voltage from said  
4 input rectifier circuit, and for providing voltage/current to a  
5 discharge lamp for providing a dimmable light;  
6 a controller for controlling the operation of the voltage inverter circuit;  
7 and  
8 a keep-alive feedback circuit for feeding back energy from said  
9 discharge lamp to said voltage inverter circuit to allow a high  
10 dimming operation.
  
1. 2. The ballast of claim 1, wherein said keep-alive feedback circuit  
2 utilizes a capacitor for said feeding back energy.
  
1. 3. The ballast of claim 1, wherein  
2 said input rectifier comprises a plurality of diodes, and further wherein  
3 said keep-alive feedback circuit comprises a capacitor connected to  
4 both said rectifier circuit and the discharge lamp for ensuring  
5 that at least one of said plurality of diodes is always conducting.
  
1. 4. The ballast of claim 1 further comprising:  
2 a constant voltage supply circuit connected to said rectifier circuit and  
3 for supplying a substantially constant voltage to said controller,  
4 wherein  
5 said constant voltage supply circuit uses a voltage of the discharge  
6 lamp to provide said substantially constant voltage when the  
7 input current is low due to the high dimming operation.

1       5. The ballast of claim 1, wherein said input rectifier circuit  
2 includes:

3           a plurality of diodes operating at a frequency above the frequency of  
4           the input voltage, wherein at any given time at least one diode is  
5           in a conducting mode due to said keep-alive feedback circuit.

1       6. The ballast of claim 5, wherein said rectifier circuit further  
2 includes a capacitor for reducing a crest factor of the discharge lamp.

1       7. A dimmable discharge lighting apparatus comprising:  
2           the electronic ballast of claim 1; and  
3           said discharge lamp, wherein  
4           said apparatus is for providing a dimmable light when connected to a  
5           dimmimg circuit for providing the input voltage.

1       8. An electronic ballast comprising:  
2           an input rectifier circuit for rectifying an input voltage;  
3           a voltage inverter circuit for receiving a rectified input voltage from said  
4           input rectifier circuit, and for providing voltage/current to a  
5           discharge lamp for providing a dimmable light;  
6           a controller for controlling the operation of the voltage inverter circuit;  
7           and  
8           a constant voltage supply circuit for supplying a substantially constant  
9           voltage to said controller, wherein  
10          said constant voltage supply circuit provides said substantially constant  
11          voltage both at low input currents and at high input currents.

1       9. The ballast of claim 8, wherein said constant voltage supply  
2           circuit uses a voltage of the discharge lamp to generate said substantially  
3           constant voltage during the low input currents, and further wherein said  
4           constant voltage supply circuit uses said voltage pulses of said inverter circuit

5 to generate said substantially constant voltage during the high input currents.

1 10. The ballast of claim 8, wherein said input voltage is from a  
2 dimming circuit, and wherein said constant voltage supply circuit includes:  
3 a first capacitor connected to said inverter circuit for generating a first  
4 current based on the voltage of said inverter circuit during a low  
5 dimming operation of the dimming circuit; and  
6 a second capacitor connected to the discharge lamp for generating a  
7 second current based on the voltage of said discharge lamp  
8 during a high dimming operation of the dimming circuit, wherein  
9 said constant voltage supply circuit sums said first current and said  
10 second current to generate said substantially constant voltage.

1 11. The ballast of claim 10, wherein said constant voltage supply  
2 circuit further includes a plurality of diodes for rectifying said first current and  
3 said second current.

1 12. The ballast of claim 8 further comprising a keep-alive feedback  
2 circuit for feeding back energy from said discharge lamp to said voltage  
3 inverter circuit to allow a high dimming operation of said apparatus.

1 13. A dimmable discharge lighting apparatus comprising:  
2 the electronic ballast of claim 8; and  
3 said discharge lamp, wherein  
4 said apparatus is for providing said dimmable light when connected to  
5 a dimming circuit for providing the input voltage.

1 14. An electronic ballast comprising:  
2 an input rectifier circuit for rectifying an input voltage from a dimming  
3 circuit;  
4 a voltage inverter circuit having solid-state switches for receiving a  
5 rectified input voltage from said input rectifier circuit, and for

6 providing voltage/currents to a discharge lamp for providing a  
7 dimmable light;  
8 a controller for controlling the operation of the voltage inverter circuit;  
9 a keep-alive feedback circuit for feeding back energy from said  
10 discharge lamp to said voltage inverter circuit to allow a high  
11 dimming operation; and  
12 a constant voltage supply circuit for supplying a substantially constant  
13 voltage to said controller, wherein said constant voltage supply  
14 circuit uses a voltage of the discharge lamp to generate said  
15 substantially constant voltage during a high dimming operation  
16 of the dimming circuit, and further wherein said constant voltage  
17 supply circuit uses said voltage/current of said inverter circuit to  
18 generate said substantially constant voltage during a low  
19 dimming operation of the dimming circuit.

1 15. The ballast of claim 14, wherein said input rectifier includes:  
2 a plurality of rectifier diodes operating at a frequency above the  
3 frequency of the input voltage, wherein at any given time at least  
4 one diode is in a conducting mode due to said keep-alive  
5 feedback circuit; and  
6 a capacitor for reducing a crest factor of the discharge lamp

1 16. The ballast of claim 15, wherein said constant voltage supply  
2 circuit includes:  
3 a first capacitor connected to said inverter circuit for generating a first  
4 current based on a voltage of said inverter circuit; and  
5 a second capacitor connected to the discharge lamp for generating a  
6 second current based on a voltage of said discharge lamp,  
7 wherein  
8 said constant voltage supply circuit sums the first current and the  
9 second current to generate said substantially constant voltage.

1           17. The ballast of claim 16, wherein said keep-alive feedback circuit  
2 utilizes a capacitor for said feeding back energy.

1           18. A dimmable discharge lighting apparatus comprising:  
2           the electronic ballast of claim 17; and  
3           said discharge lamp, wherein  
4           said apparatus is for providing a dimmable light when connected to the  
5           dimmimg circuit having a phase dimmer.

1           19. A dimmable discharge lighting apparatus comprising:  
2           the electronic ballast of claim 14; and  
3           said discharge lamp, wherein  
4           said apparatus is for providing a dimmable light when connected to the  
5           dimmimg circuit having a phase dimmer.

1           20. The ballast of claim 14, wherein said constant voltage supply  
2           circuit includes:  
3           a first capacitor for generating a first current based on a voltage of the  
4           discharge lamp; and  
5           a second capacitor for generating a second current based on a voltage  
6           output by said inverter circuit, wherein  
7           said constant voltage supply circuit sums the first current and the  
8           second current to generate said substantially constant voltage.